

Nanostructured Catalyst for In-Situ Production of Methanol for ISRU Applications, Phase I

Completed Technology Project (2005 - 2005)



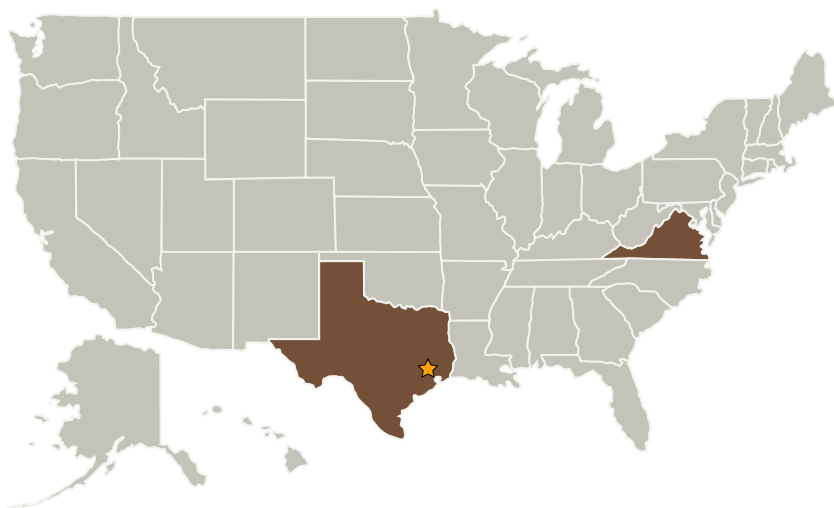
Project Introduction

One of the most significant challenges in exploration of extraterrestrial planets such as Mars is the availability of efficient and reliable sources of fuel and energy that can be generated from resources available in situ. In Situ Resource Utilization (ISRU) of Martian materials to produce power can result in a reduction of mass requirements for exploration missions, a reduction in mission risk and cost, and expanded human presence in extraterrestrial planets. Methanol-based fuel cells are promising energy sources since methanol can be generated carbon dioxide that is found in Mars. Although there are already catalysts that can produce methanol from carbon dioxide, the efficiency of the synthesis has to be improved manifolds for the catalyst to be of use in Mars. There is therefore a need to improve existing catalysts. In this Phase I effort, Materials Modification Inc. proposes to utilize the principles of nanotechnology to prepare a novel nanoshell-type catalyst that is expected to exhibit higher efficiency of conversion compared to existing catalytic systems for the synthesis of methanol from carbon dioxide. Phase II will involve optimization of the nanoshell synthesis process, rigorous testing and commercializing the product/technology in collaboration with industrial partners and NASA for use in ISRU applications.

Anticipated Benefits

Industrial methanol production and fuel source for the next generation of fuel cells to be used in automobiles, phones, and other devices that need portable power. Methanol production for ISRU applications

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Materials Modification, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia

Primary U.S. Work Locations	
Texas	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Kris Lee

Principal Investigator:

T S Sudarshan

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.3 Resource Processing for Production of Mission Consumables